Yellowstone National Park is home to the largest concentrations of mammals in the lower 48 states.

- 60 different mammals live here, including a wide variety of small mammals
- Several hundred grizzly bears live in the greater Yellowstone area
- Black bears are common
- Gray wolves were restored in 1995; more than 100 live in the park now
- Lynx and wolverine—two predators that require expanses of wilderness—probably live here
- Seven native species of ungulates—elk, mule deer, bison,moose, bighorn sheep, pronghorn, and white-tailed deer—live here,including one of the largest herds of elk in the United States
- Non-native mountain goats appear to be colonizing the park

ORDER Carnivora	Habitat	Estimated Population
Family Ursidae		
Black Bear	forests, meadows	500–650
Grizzly Bear	forests, meadows	280–610
Family Canidae		
Coyote	forests, meadows, grasslands	common
Gray Wolf	forests, meadows	164–169
Fox	meadows	occasional
Family Felidae		
Bobcat	forests, meadows	may be widespread
Cougar	mountains, rocky areas	20–35
Lynx	sub-alpine forests	rare, if present
Family Procyonidae		
Raccoon	rivers, cottonwoods	occasional
Family Mustelidae		
Badger	sagebrush	common
Fisher	forests	rare, if present
Marten	coniferous forests	common
Mink	riparian forests	occasional
River Otter	rivers, lakes, ponds	common
Striped Skunk	riparian to forest	occasional
Long-tailed Weasel	willows to spruce/fir forests	common
Short-tailed Weasel (ermine)	willows to spruce/fir forests	common
Wolverine	alpine, coniferous forests	rare
ORDER Artiodactyla		
Family Cervidae		
Elk (Wapiti)	meadows, forests	30,000 in summer
Moose	riparian, forests	<1,000
Mule Deer	forests, grasslands, shrub lands	2,500
White-tailed Deer	forests, grasslands, shrub lands	occasional
Family Bovidae		
Bison	meadows, grasslands	3,000
Bighorn Sheep	alpine meadows, cliffs	150–225
Mountain Goat (non-native)	rocky slopes	rare

Family Antilocapridae		
Pronghorn	sagebrush, grasslands	200–250
ORDER Chiroptera		
Family Vespertilionidae		
Big Brown Bat	roost in cliffs, attics; feed around water	rare
Little Brown Bat	roost in cliffs, attics; feed around water	common
Long-eared Bat	roost in cliffs, attics; feed around water	common
Big-eared Bat	roost in cliffs, attics; feed around water	common
ORDER Lagomorpha		
Family Leporidae		
Snowshoe Hare	forests, willows	common
White-tailed Jackrabbit	sagebrush, grasslands	common
Desert Cottontail	shrub lands	common
Mountain Cottontail	shrub lands	common
Family Ochotonidae		
Pika	rocky slopes	common
ORDER Insectivora		
Family Soricidae		
Dusky Shrew	moist meadows, forests	common
Masked Shrew	moist meadows, forests	common
Water Shrew	moist meadows, forests	common
Preble's Shrew	moist meadows, forests	rare, if present
Dwarf Shrew	moist meadows, forests	rare
ORDER Rodentia		
Family Castoridae		
Beaver	ponds, streams	300–350
Family Sciuridae		
Least Chipmunk	forests	common
Uinta Chipmunk	forests	common
Yellow Pine Chipmunk	forests	common
Yellow-bellied Marmot	rocky slopes	common
Golden-mantled Ground Squirrel	forests, rocky slopes	common
Northern Flying Squirrel	forests	occasional
Red Squirrel	forests	common
Uinta Ground Squirrel	sagebrush, meadows	common
Family Geomyidae		
Northern Pocket Gopher	sagebrush, meadows, forests	common
Family Cricetidae		
Deer Mouse	grasslands	common
Western Jumping Mouse	riparian	occasional
Muskrat	streams, lakes, ponds	common
Heather Vole	sagebrush to forests	occasional
Long-tailed Vole	moist meadows	common
Meadow Vole	moist meadows	common
Montane Vole	moist meadows	common
Red-backed Vole	dense forests	common
Water Vole	riparian	occasional
Bushy-tailed Woodrat	rocky slopes	common
Family Erethizontidae		
Porcupine	forests, sagebrush, willows	common

3:2

Small Mammals

Numerous small mammals live in Yellowstone National Park. The park's interpretive rangers chose the following species to describe either because visitors are likely to see them or inquire about them.

GOLDEN-MANTLED GROUND SQUIRREL

Identification

- 9–12 inches; 7.4–11 ounces
- Often mistaken for a least chipmunk; distinguished by larger size, more robust body, shorter tail, and lateral stripes that do not extend onto the sides of the head.
- In the adults the head and shoulders are reddish-brown color, their "mantle"

Habitat

- Found throughout Yellowstone at all elevations in rocky areas, edges of mountain meadows, forest openings, tundra
- 87% of diet consists of fungi and leaves of flowering plants; other foods include buds, seeds, nuts, roots, bird eggs, insects, and carrion
- Predators include coyotes, weasels, badgers, hawks

Behavior

- Hibernate from October to March or April
- Breeding occurs shortly after both males and females emerge from hibernation; one litter of 5 young per year

LEAST CHIPMUNK

Identification

- 7.5–8.5 inches long, 1.2 ounces
- Smallest member of the squirrel family; one of three chipmunk species in the park
- Alternating light and dark stripes on its back and sides, with the outermost stripe on the sides being dark; underside tends to be white and its tail has black-tipped hairs with a reddish undertone

Habitat

- Prefers sagebrush valleys, shrub communities, and forest openings
- Eats primarily plant material, especially seeds and other fruits, but will also eat conifer seeds and some insects
- Preyed on by various hawks and probably foxes and coyotes

Behavior

- In YNP this species hibernates but also stores some food and probably arouses frequently during the winter
- Breeding begins as snowmelt occurs usually late March until mid May; one litter of 5–6 young per year
- Little is known about their vocalizations but they do have "chipping" (which may be an alarm) and "clucking" calls
- Can be identified by quick darting movements and it seems to carry its tail vertically when moving

LONG-TAILED WEASEL

Identification

- 13–18 inches long, 4.8–11 ounces
- Light to dark brown dorsally; belly is buff to rusty orange; chin white, tail makes more than 40% of its body length
- Males 40% larger than females

Habitat

- Found in forests, open grassy meadows and marshes, and near water
- Eat voles, pocket gophers, mice, ground and tree squirrels, rabbits; to a lesser degree birds, eggs, snakes, frogs, and insects

Behavior

- Breeding occurs in early July and August; one litter of 6–9 young per year
- Solitary animals except during breeding and rearing of young

Resources for more information are listed at the end of Chapter 3, pages 82–84.

MARTEN

Identification

- 18–26 inches long, 1–3 pounds
- Weasel family; short limbs and long bushy tail; fur varies from yellow to brown to black; irregular, yellowish to bright orange throat patch
- Smaller than a fisher; lighter in color, orange bib rather than white

Habitat

- Found in conifer forests with dense canopy and understory of fallen logs and stumps; will use riparian areas, meadows, forest edges and rocky alpine areas
- Eat primarily small mammals such as red backed voles, red squirrels, snowshoe hares, flying squirrels, chipmunks, mice and shrews; also to a lesser extent birds and eggs, amphibians and reptiles, earthworms, insects, fruit, berries, carrion

Behavior

- Solitary except in breeding season; breeding occurs in July & August; delayed implantation; 1–5 young born in mid March to late April
- Active throughout the year; hunt mostly on the ground
- Rest or den in hollow trees or stumps, in ground burrows or rock piles, in excavations under tree roots

MONTANE VOLE

Identification

- 5–7.6 inches long, 1.2–3.2 ounces
- Brownish to grayish-brown, occasionally grizzled; ventral side is silvery gray; relatively short tail is bi-colored

Habitat

- Found at all elevations in moist mountain meadows with abundant grass and grassy sagebrush communities; also common in riparian areas
- Grass is their primary food source
- Probably the most important prey species in the park; eaten by coyotes, raptors, and other animals

Behavior

- Typically breeds from mid February to November; up to 4 litters of 2–10 young per year
- Active all year-round maintaining tunnels in the winter; also dig shallow burrows

PIKA

Identification

- 7–8.4 inches long; 5.3–6.2 ounces (about the size of a guinea pig)
- Tailless, gray to brown with circular ears

Habitat

- Found on talus slopes at nearly all elevations in the park
- Eat plant foods such as grasses, sedges, aspen, lichen, and conifer twigs
- Predators include coyotes, martens, and hawks

Behavior

- Active during the day; darts around on rocks
- Often heard but not seen; makes a distinct shrill whistle call or a short “mew”
- Breeds in spring; two litters per year
- Scent marks by frequently rubbing cheeks on rocks
- Late summer they gather mouthfuls of vegetation to build “haystacks” for winter food; defends haystacks vigorously.
- Haystacks often built in same place year after year; have been known to become three feet in diameter

POCKET GOPHER

Identification

- 6–10 inches long, 2.6–6.3 ounces
- Very small eyes and ears; smooth fur that is brown to tan; short tail; long front claws for burrowing; large external pouches are good for carrying food

Habitat

- Found from lowest valleys to rocky alpine meadows; only restriction in range seems to be topsoil depth, which limits burrowing
- Preyed upon by owls, badgers, grizzly bears, coyotes, weasels, and other predators
- Snakes, lizards, ground squirrels, deer mice, and other animals use their burrows
- In the top 6–8 inches below the surface they forage for forbs, some grasses and underground stems, bulbs and tubers
- Transport food in their cheek pouches to underground cache

Behavior

- Breed in May and April; one litter of 5 young per year
- Burrow systems are elaborate and often bi-level; can be 400–500 feet long
- Very territorial; only one per burrow
- Grizzly bears will sometimes dig up these caches, including an unsuspecting gopher
- Do not hibernate, but instead burrow into the snow; often fill tunnels with soil forming worm-like cores that remain in the spring after snow melts

RED SQUIRREL

Identification

- 11–15 inches long, 6.7–7 ounces
- Brownish-red on its upper half; dark stripe above white ventral side; light eye ring; bushy tail
- Quick, energetic
- Loud, long chirp to advertise presence; much more pronounced in the fall

Habitat

- Spruce, fir, and pine forests; young squirrels found in marginal aspen habitat
- Eat conifer seeds, eat terminal buds of conifer trees, fungi, some insects; sometimes steal young birds from nests
- Preyed on by coyotes, grizzly bears, hawks

Behavior

- Breeds February–May, typically March and April; one litter of 3–5 young
- One of the park's most territorial animals; territorialism ensures winter food supply
- In fall, cuts cones from trees and caches them in middens, which are used for years and can be 15 by 30 feet; grizzlies search out these middens in whitebark pine habitat to obtain the nuts

RIVER OTTER

Identification

- 40–54 inches long, 10–30 pounds
- Sleek, cylindrical body; small head; tail nearly one third of the body and tapers to a point; feet webbed; claws short; fur is dark dense brown
- Ears and nostrils close when underwater; whiskers aid in locating prey

Habitat

- Most aquatic member of weasel family; rarely found far from water
- Eats crayfish and fish; also frogs, turtles, sometimes young muskrats or beavers

Behavior

- Breeds in late March through April; one litter of two young per year
- Females and offspring remains together until next litter; may temporarily join other family groups
- Can swim underwater up to 6 miles per hour and for 2–3 minutes at a time
- Not agile or fast on land unless they find snow or ice, then can move rapidly by alternating hops and slides; can reach speeds of 15 miles per hour
- Mostly crepuscular but have been seen at all times of the day
- Active year-round

3:2

SHORT–TAILED WEASEL (ERMINE)

Identification

- 8–13 inches long, 2.1–7 ounces
- Typical weasel shape, a very long body, short legs and pointed face: tail makes up 40% of its body
- Males about 40% larger than females
- Fur is light brown in summer and white in winter

Habitat

- Eat voles, shrews, deer mice, rabbits, rats, chipmunks, grasshoppers, and frogs
- Found in willows and spruce forests

Behavior

- Breeding takes place in early to mid summer; 1 litter of 6–7 young per year
- Can leap repeatedly three times their length
- Will often move through and hunt in rodent burrows

SNOWSHOE HARE

Identification

- 14.5–20 inches long, 3–4 pounds
- Large hind feet enable easy travel on snow; white winter coat offers camouflage; gray summer coat
- Transition in seasonal fur color takes about 70–90 days; seems to be triggered in part by the day length

Habitat

- Found throughout YNP in coniferous forests with dense understory of shrubs, riparian areas with many willows, or low areas in spruce-fir cover
- Rarely ventures from dense forest cover except to feed in forest openings
- Eats plants
- Preyed upon by lynx, bobcats, coyotes, foxes, some hawks, and great horned owls

Behavior

- Breed from early March to late August
- Young are born with hair, grow rapidly and are weaned within 30 days
- Mostly nocturnal; their presence in winter is only advertised by a network of well worn trails in the snow
- Docile except during the breeding season when they chase each other, drum on the ground with the hind foot, leap into the air, and occasionally battle each other

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UINTA GROUND SQUIRREL

Identification

- 11–12 inches long, 7–10 ounces
- Grayish back and rump with fine white spots on back; nose and shoulders are tan to cinnamon; tail is grayish underneath

Habitat

- Found in disturbed or heavily grazed grasslands, sagebrush meadows, and mountain meadows up to 11,000 feet
- Eats grasses, forbs, mushrooms, insects, and carrion (including road-killed members of its own species)
- Preyed on by long-tailed weasels, hawks, coyotes, badgers

Behavior

- Hibernate mid July through March
- Breeds in early spring; one litter of 6–8 young per year
- Young, after they leave the burrow, are vulnerable to long-tailed weasels and hawks
- During cool spring weather, Uinta ground squirrels active at all times of day, as the weather warms activity more limited to morning, late afternoon, and evening

Uinta ground squirrels frequently stand upright on their hind feet. This posture would fool wagon trains, because from a distance the animal looked like a picket pen driven into the prairie, which usually indicated water and a place to camp. Thus their nickname of "picket pens."

WOLVERINE

Identification

- 28–42 inches long, 30–60 pounds
- Largest member of weasel family; compact and strongly built, broad head, short legs; black to dark brown with white on chest may extend as bands onto sides; shaggy appearance due to long guard hairs

Habitat

- Found in undisturbed conifer forests and alpine tundra; wolverines considered an indicator of true wilderness
- Eats burrowing rodents, birds, eggs, beavers, squirrels, marmots, mice, and vegetation; has also been known to take large prey such as deer or elk when snow is deep

Behavior

- Breeds April to October; 1 litter of 2–4 young each year
- Den under log jams, uprooted trees, caves
- Solitary except when breeding
- Primarily nocturnal, active year-round

YELLOW-BELLIED MARMOT

Identification

- 20–28 inches long; 3.5–11 pounds
- One of the largest rodents in YNP
- Reddish-brown upper body; yellowish belly; small ears; prominent active tail

Habitat

- Found from lowest valleys to alpine tundra, usually in open grassy communities and almost always near rocks
- Feed on grasses and forbs in early summer; switch to seeds in late summer, occasionally will eat insects
- Preyed on by coyotes, grizzlies, and golden eagles

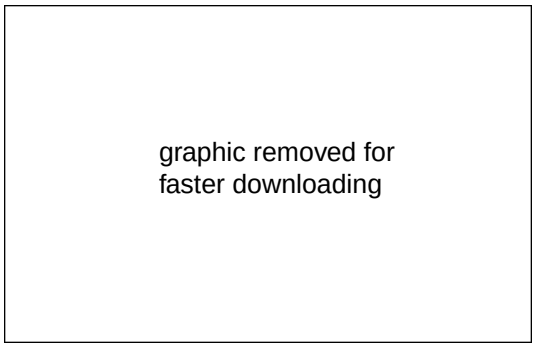
Behavior

- Hibernate up to 8 months, emerging from February to May depending on elevation; may estivate in June in response to dry conditions and lack of green vegetation and reappear in late summer
- Breeds within two weeks of emerging from hibernation; average 5 young per year
- Active in morning, late afternoon, and evening
- Colonies consist of one male, several females, plus young of the year
- Vocalizations include a loud whistle (early settlers called them whistle pigs), a “scream” used for fear and excitement; a quiet tooth chatter that may be a threat
- Males are territorial; dominance and aggressiveness demonstrated by waving tail slowly back and forth

Resources for more information are listed at the end of Chapter 3, pages 82–84.

3:2

Bear, Black



As of March 2001 . . .

Number in Yellowstone
500–650, estimate

Where to see
Tower and Mammoth areas, most often

Behavior & Size
- males weigh 210–315 pounds, females weigh 135–160 pounds; adults stand about 3 feet at the shoulder
- may live 15–20 years
- home range: male, 6–124 square miles, female, 2–45 square miles
- can climb trees; adapted to life in forest and along forest edges
- food includes rodents, insects,elk calves,cutthroat trout, pine nuts, grasses and other vegetation
- mates in spring; gives birth while in winter den to 1–4 cubs

History
- Along with grizzlies, used to be fed at dumps within the park
- For years, black bears were fed by visitors from vehicles
- Both of these actions resulted in bears losing fear of humans, pursuing human food, which resulted in visitor injuries, property damage, and the need to destroy "problem bears"

Management Status
- 1960, black bear management program implemented, which has reduced the number of bear-caused human injuries and property damage; and has re-established black bears in a natural state
- 2000, new study begun to find out how black bears fit into the mix of Northern Range predators; three black bears have been radio-collared

In Yellowstone, about 50 percent of black bears are black *(Ursus americanus)*, others are brown and cinnamon. Black bears stand about 3 feet high at the shoulder. Males weigh 210–315 pounds; females weigh 135–160 pounds. They have fair eyesight and an exceptional sense of smell.

Black bears eat almost anything, including grass, berries, fruits, tree cambium, bird eggs, nuts, insects, fish, and carrion. Their short, curved claws enable them to climb trees, but do not allow them to dig for roots or ants as well as a grizzly bear can (grizzlies have longer, less-curved claws).

During fall and early winter, bears spend most of their time feeding, and this effort increases during "hyperphagia," the pre-denning period in autumn. In November they locate or excavate a den on north-facing slopes between 5,800–8,600 feet. There, they hibernate until late March.

Most scientists consider bears to be true hibernators. Some hibernating animals experience an extreme drop in metabolism with a cooling of body temperature and near stoppage of respiration and circulation. Bears undergo these changes but to a less dramatic extent than some other species like marmots or ground squirrels, and they can be easily roused from hibernation.

For the better part of the year, males and females without cubs are solitary. The exception is during the mating season, which is May to early July. They may mate with a number of individuals, but pairs will occasionally stay together for the entire period. For both genders, the usual first breeding season is at age four. After fertilization, the barely developed blastocyst (egg) does not immediately implant in the uterus, a process called "delayed implantation." If the bear is healthy when she dens for the winter, implantation and development will begin; if not, her body will abort the blastocyst. Total gestation time is 200 to 220 days, but only during the last half of this period does fetal development occur.

Birth occurs in mid January; the female becomes semiconscious during delivery. Usually two cubs are born, though there may be one or three; four are rare. The new cubs are blind, toothless, and almost hairless. After delivery the mother continues to sleep for another two months, during which time the cubs alternately suckle and sleep.

After emerging from the den, the cubs and their mother roam over her home territory. The animals have no regular summer den and sleep wherever they happen to be. In the fall, the cubs den with their mother. The following spring, the cubs and mother separate.

When faced with a threat, black bears are likely to retreat up a tree or flee outright, rather than reacting aggressively. However, any bear, particularly a female with cubs, may attack when surprised at close range. And black bears are more likely than grizzlies to stalk a human—although this is rare. Whether it's a grizzly or a black bear, always give these animals a wide berth.

Resources for more information are listed at the end of Chapter 3, pages 82–84.

3:2

Bears, Comparison

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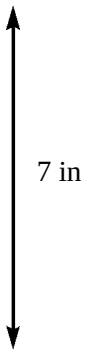
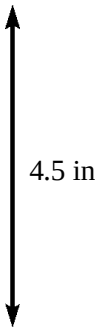


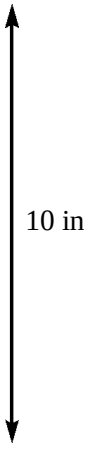


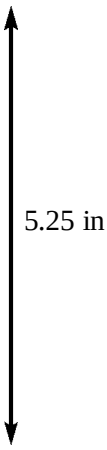
Black Bear

rear

front

Grizzly Bear





rear

rear

front

3:2

Bear, Grizzly

As of March 2001 . . .

Number in Yellowstone
Estimated 280–610 bears

Where to see
Most commonly seen at dawn and dusk in the Hayden and Lamar valleys, on the north slopes of Mt. Washburn, and from Fishing Bridge to the East Entrance

Behavior & Size
- males weigh 300–700 pounds, females weigh 200–400 pounds; adults stand about 3-1/2 feet at the shoulder
- may live 15–20 years
- home range: male, 813–2,075 square miles,female, 309–537 square miles
- agile; can run up to 45 miles per hour
- can climb trees but curved claws and weight make this difficult
- adapted to life in forest and meadows
- food includes rodents, insects,elk calves,cutthroat trout, roots, pine nuts, grasses, and large mammals
- mates in spring; gives birth while in winter den to 2–3 cubs, rarely 4

Status
- Yellowstone is one of only two major areas south of Canada still inhabited by grizzly bears
- In July, 1975, the grizzly bear was listed as a threatened species under the Endangered Species Act

Current Management
See "Bear Management History" in this chapter & related articles in Chapter 6

The grizzly bear *(Ursus arctos horribilis)* is a subspecies of brown bear that once roamed the mountains and prairies of the American West. Today, the grizzly bear remains in a few isolated locations in the lower 48 states, including Yellowstone.

The name "grizzly" comes from the frequent presence of silver-tipped or "grizzled" hairs on the animals' coats. However, the coloration of black and grizzly bears is so variable that it alone is not a reliable means of telling the two bears apart. Particularly when bears are not fully grown or when seen only briefly or at a long distance, it can be difficult to correctly identify one bear species from another.

It is commonly said that grizzly bears cannot climb trees. This is not true, especially when the bears are small. As grizzlies increase in size and as their claws grow longer, they have a harder time climbing. Stories that bears cannot swim or run downhill are also persistent—and incorrect. Grizzlies can sprint up to 45 miles per hour.

Bears are generally solitary, although they may tolerate other bears when food is not limited. Mating season occurs from mid May to mid July, and bears may mate with multiple partners during a single season. Females do not breed until at least age 4 or 5. Bears experience "delayed implantation," meaning that the embryos do not begin to develop until late November or December. This appears to be a strategy allowing the mother bear to save up energy until entering her winter den, where the cubs are born in late January or February. A litter of two or three cubs is common, litters of four cubs occur occasionally. Male bears take no part in raising cubs and may pose a threat to younger bears. A mother grizzly will usually keep her cubs with her for two winters following their birth, after which time she (or a prospective suitor) chases the subadult bears away so she can mate again. Female cubs frequently establish their home range in the vicinity of their mother, but male cubs must disperse farther in search of a home.

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They can be effective predators, especially on such vulnerable prey as elk calves and spawning cutthroat trout. They also scavenge meat when available, such as from winter-killed carcasses of elk and bison, from road-killed wildlife, and from wolves and cougars. They eat small mammals (such as pocket gophers) and insects (such as ants and army cutworm moths that summer on high-elevation talus slopes), both of which provide important, high-protein food. A grizzly's long claws and strong shoulders make it an efficient digger for roots, bulbs, corms, and tubers, and rodents and their caches. They also eat a wide variety of plants, including whitebark pine nuts, berries, sedges, grasses, glacier lilies, dandelions, yampas and biscuitroots, horsetails and thistles. And, of course, they will eat human food and garbage where they can

Resources for more information are listed at the end of Chapter 3, pages 82–84.

get it. This is why managers emphasize that keeping human foods secure from bears increases the likelihood that humans and bears can peacefully co-exist in greater Yellowstone.

Grizzlies have a social hierarchy in which adult male bears dominate the best habitats and food sources, generally followed by mature females with cubs, then by other single adult bears. Subadult bears, who are just learning to live on their own away from mother's protection, are lowest on the social ladder and most likely to have to make a living in poor-quality habitat or in areas nearer roads and developments. Thus, young adult bears are most vulnerable to danger from humans and other bears, and to habituation. Habituation often results in a bear being transferred or ultimately removed from the wild population.

Bears spend most of their time feeding, and this effort increases during "hyperphagia," the pre-denning period in autumn. They locate or excavate dens on densely vegetated, north-facing slopes between 6,562–10,000 feet. Bears enter their winter dens between mid October and early December. Although grizzlies are considered true hibernators (see black bear description for more on this), they do sometimes awaken and leave their dens during the winter.

3:2

Bears: Management History

Early visitors to Yellowstone National Park developed an interest in the area's wildlife—especially the bears. Dumps as bear-viewing sites quickly became a primary tourist attraction. At the height of the bear-feeding era, hundreds of people sat nightly in bleachers and watched as bears fed on garbage.

Despite the official prohibition in 1902 against hand-feeding bears, Yellowstone National Park became known as the place to see and interact with bears. Roadside bears, often receiving handouts from enthusiastic park visitors, caused "bear jams"—a traffic jam resulting from the presence of one or more photogenic park bears, black or grizzly, often with a park ranger standing by to direct traffic, answer questions, and even pose for pictures.

In 1931, as park visitation and the number of bear-human conflicts began to increase, park managers began keeping detailed records of bear-caused human injuries, property damages, and subsequent nuisance bear control actions. Between 1931 and 1969 an average of 48 bear-inflicted human injuries and more than 100 incidents of property damage occurred annually in Yellowstone.

In 1959 and continuing through 1971, Drs. John and Frank Craighead, who are brothers, conducted a pioneering ecological study of grizzly bears in Yellowstone. Their research provided the first scientific data about grizzlies in this ecosystem, which enabled park managers to manage bears based on science and solve the underlying causes leading to bear-human conflicts.

In 1960, the park implemented a bear management program—directed primarily at black bears—designed to reduce the number of bear-caused human injuries and property damages that occurred within the park and to re-establish bears in a natural state. It included expanded efforts to educate visitors about bear behavior and the proper way to store food, garbage, and other bear attractants; prompt removal of garbage to reduce its availability to bears, and the development and use of bear-proof garbage cans; stricter enforcement of regulations that prohibited the feeding of bears; and the removal of potentially hazardous bears, habituated bears, and those bears that damaged property in search of food.

After 10 years of this bear management program, the number of bear-caused human injuries decreased only slightly, to an average of 45 each year. Consequently, in 1970, Yellowstone initiated a new, more intensive bear management program that included the controversial decision to eliminate the unsanitary open-pit garbage dumps inside the park. The long-term goal was to wean bears away from unnatural concentrations

Feeding Bears
- 1889: Bears gathered at night to feed on garbage behind park hotels
- 1910: First incidents of bears seeking human food along park roads
- 1916: First confirmed bear-caused human fatality

Early Management
- 1931: Park began keeping detailed records of bear-inflicted human injuries, property damage, and bear control actions
- 1931–1969: average of 48 bear-inflicted human injuries and more than 100 incidents of property damage occurred annually in Yellowstone

Changes in Management
- 1970: Yellowstone implemented a new bear management program to restore bears to subsistence on natural foods and to reduce the human injuries and property damage
- Strict enforcement of regulations prohibiting the feeding of bears, and requiring proper storage of human food and garbage
- All garbage cans in the park converted to a bear-proof design
- Garbage dumps closed within and adjacent to the park

Current Status
- In 1975, the grizzly bear population in the Yellowstone ecosystem was listed as a threatened species under the Endangered Species Act
- Decrease in human injuries from 45 injuries per year in the 1960s to 1 injury per year in the 1990s
- Decrease in property damage claims from 219 per year in the 1960s. to an average of 7 per year in the 1990s
- Decrease in number of bears that must be killed or removed from the park from 33 black bears and 4 grizzlies per year in the 1960s to an average of 0.2 black bear and 0.3 grizzly bear per year in the 1990s
- Decrease in bear relocations away from the front country from more than 100 black bears and 50 grizzlies per year in the 1960s to an average of 0.4 black bear and 0.9 grizzly bear per year in the 1990s
- For more detailed information on current management, see Chapter 6

The first bear-caused human fatality within Yellowstone occurred in 1916 when a grizzly bear killed a wagon teamster in a roadside camp. At the time, park managers considered this bear's behavior to be completely out of the ordinary.

Reductions in Conflict

Most bear-human conflicts before 1983 involved habituated bears aggressively seeking human foods.

From 1983 to 1993, most bear-human conflicts involved habituated bears seeking natural foods near humans.

Since 1983, bear-caused human injuries have declined to an average of 1 per year.

The number of bears removed from the population has also declined significantly from earlier periods.

Because of the IGBST and the earlier Craighead studies, greater Yellowstone managers have amassed the longest continuous database for any grizzly bear population in the lower 48 states.

The rate of cubs surviving to adulthood is high (about 33 percent), and the average litter size has increased from 1.9 observed in the mid 1970s to 2.15 in the mid 1990s.

of food and back to a natural distribution and a diet of plant and animal foods available throughout the ecosystem.

The Craigheads predicted bears would range more widely, resulting in more bear-human conflicts and subsequent bear mortalities. This indeed occurred in the short-term. During the program's first three years, an average of 38 grizzly bears and 23 black bears were trapped each year and translocated from roadsides and developed areas to backcountry areas. In addition, an average of 12 grizzly bears and 6 black bears were removed from the population each year. However, bear-caused human injuries decreased significantly to an average of 10 each year. After 1972, the number of bear-human conflicts and bear management control actions declined significantly.

In 1983, the park implemented a new grizzly bear management program. The 1983 program emphasized habitat protection in backcountry areas. The park established "bear management areas" where recreational use was restricted in areas with seasonal concentrations of grizzly bears. The goals were to minimize bear-human interactions that might lead to habituation of bears to people, to prevent human-caused displacement of bears from prime food sources, and to decrease the risk of bear-caused human injury in areas with high levels of bear activity. This program continues today.

Listing as a Threatened Species

In 1975, the grizzly bear in the lower 48 states was listed as threatened under the Endangered Species Act, in part, because the species was reduced to only about two percent of its former range south of Canada. Five or six small populations were thought to remain, totaling 800 to 1,000 bears. The southernmost—and most isolated—of those populations was in greater Yellowstone, where some 250 to 300 grizzly bears were thought to have remained the mid 1970s.

The listing of the grizzly for protection under the Endangered Species Act resulted in cessation of grizzly bear hunting, and the development of numerous plans and guidelines to protect the remaining bears and their habitat within an identified recovery area. The Yellowstone grizzly bear recovery area is approximately 9,500 square miles in size and includes all of Yellowstone National Park, the John D. Rockefeller, Jr. Memorial Parkway, significant portions of Grand Teton National Park and the Bridger-Teton, Shoshone, Gallatin, Targhee, Custer, and Beaverhead national forests. It also includes Bureau of Land Management lands and state and private lands in Idaho, Montana, and Wyoming.

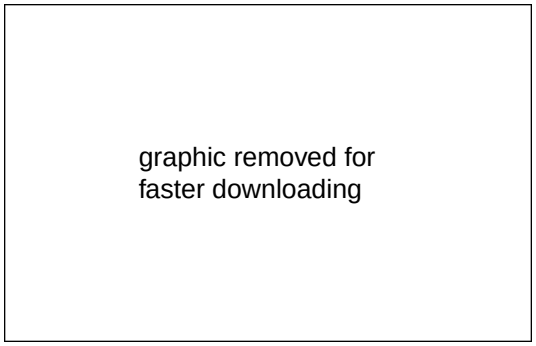
Research and management of grizzlies in greater Yellowstone intensified after the 1975 establishment of the Interagency Grizzly Bear Study Team (IGBST). The team, in cooperation with state wildlife managers in Idaho, Montana, and Wyoming, have monitored bears, estimated the number and trend of the population, and enhanced our understanding of grizzly bear food habits and behavior in relation to humans and to other wildlife species.

In 1983, the Interagency Grizzly Bear Committee (IGBC) was created in order to increase the communication and cooperative efforts among managers of grizzly bears in all recovery areas. Twice each year, managers meet to discuss common challenges related to grizzly bear recovery. They supervise the implementation of public education programs, sanitation initiatives, and research studies to benefit the grizzly bear populations in Yellowstone and the other recovery areas.

Scientists and managers believe that, despite the continuing growth in human use of greater Yellowstone, the grizzly population has been stable to slightly increasing since 1986. The bears seem to be reproducing well and raising cubs in nearly all portions of the recovery area. More and more frequently, bears have been seen well outside Yellowstone National Park, south into Wyoming's Wind River Range, north throughout the Gallatin Range, and east of the Absarokas onto the plains. By tracking radio-collared bears, we know that these are not "park bears" leaving Yellowstone for places beyond, but previously unmarked bears and offspring dispersing into new and vacant but suitable habitats. In 1996, scientists estimated with 90 percent confidence that the Yellowstone grizzly population was between 280 and 610 bears. While many people may wish for a more precise estimate, it is not possible to count wide-ranging and fairly solitary animals like bears with complete accuracy.

3:2

Beaver



As of March 2001 . . .

Number in Yellowstone
Minimum estimate:300

Where to see
In summer 2000, beavers had lodges in the Lamar, Gardner, Madison, and Gallatin rivers, Trout Creek (Hayden Valley),Willow Park (between Mammoth and Norris), Beaver Ponds (Mammoth area), and Harlequin Lake (Madison area) in the front country; upper Yellowstone River (Thorofare region) and Bechler River in the backcountry.

Behavior & Size
- active at night; seldom seen during day.
- on rivers, may build bank dens instead of lodges
- one lodge may support 1–6 beavers that are usually related; this group is called a colony
- 35–40 inches long, including tail
- weighs 30–60 pounds

Other Info
- Yellowstone's beaver escaped most of the trapping that occurred in the 1800s due to the region's inaccessibility
- Beaver have always lived in Yellowstone
- Park biologists periodically survey the park for beaver; the most recent survey was conducted in 1999

Since 1989, park staff have periodically surveyed riparian habitat in Yellowstone to determine current presence and distribution of beaver (Castor canadensis). These surveys confirm that beaver live throughout Yellowstone National Park but are concentrated in the southeast (Yellowstone River delta area), southwest (Bechler area), and northwest portions (Madison and Gallatin rivers) of the park. These areas are likely important habitat because of their waterways, meadows, and the presence of preferred foods such as willow, aspen, and cottonwood.

Beaver, however, are not restricted to areas that have their preferred foods. Essentially no aspen exist in some areas where beaver sign is most abundant, such as in the Bechler River. The same is true in other areas where beaver periodically live, such as Heart Lake, Grizzly Lake, the lower Lamar River and Slough Creek area, the Beaver Ponds near Mammoth, Slide Lake, and the lower Gardner River. In these areas, beaver appear to use lodgepole pine and some Douglas-fir for construction purposes and/or for food. In areas where preferred woody plants are only present in very small densities or are absent, beavers may feed solely on submerged vegetation such as pond lilies.

Beaver are famous as dam builders, and examples of their work can be seen from the roads in the park. An old dam is visible at Beaver Lake between Norris and Mammoth, and a newer dam is located on Trout Creek in Hayden Valley. Most dams are on small streams where the gradient is mild, and the current is relatively placid during much of the year. Colonies located on major rivers or in areas of frequent water level fluctuations, such as the Lamar River, den in holes in the riverbank.

Male and female beaver look alike—thick brown fur, paddle-shaped tail, weigh 30–60 pounds, and are about 35 to 40 inches long, including tail. When hunched over their food, beaver can resemble round river rocks.

Because beaver are most active at night, visitors seldom see them. But these animals don't necessarily avoid areas of moderate to high levels of human use. Several occupied lodges in Yellowstone are close to popular backcountry trails and/or campsites. Every year, beaver are seen along main park roadways. The nocturnal habits of beaver seem to be enough to separate them from human use of the same area.

People who wait near known beaver activity areas may be rewarded with the sight of them swimming smoothly along or clambering onto the bank to gnaw at trees. But they may just as likely hear the sound of a startled or surprised beaver—the sharp sound of the beaver slapping its tail on the water before it submerges to seek safety.

Resources for more information are listed at the end of Chapter 3, pages 82–84.

3:2

Bighorn Sheep

As of March 2001 . . .

Number in Yellowstone
150–225

Where to See
- Summer: slopes of Mount Washburn, along Dunraven Pass
- Year-round: Gardner Canyon, between Mammoth and the North Entrance. Also: On cliffs along the Yellowstone River opposite Calcite Springs; above Soda Butte; in backcountry of eastern Absarokas

Behavior and Size
- adult male (ram) up to 300 pounds, including horns that can weigh 40 pounds
- adult female (ewe) up to 200 pounds
- both sexes have horns
- feed primarily on grasses; forage on shrubby plants in fall and winter
- mating season begins November
- one to two lambs born in May or June

Management
- Bighorns in Gardner Canyon and on Mount Washburn exhibit some habituation to humans; be alert to them along the road; never feed them
- Early accounts that reported large numbers of bighorn sheep in Yellowstone have led to the speculation that they were more numerous before the park was established
- A chlamydia (pinkeye) epidemic in 1982 reduced the herd by 60 percent
- Other factors that may be limiting the population now:over-hunting outside the park, introduction of other domestic livestock diseases, difficulty in re-colonizing previous habitats

Bighorn sheep *(Ovis canadensis)* once numbered in the millions in the western United States. The bighorn was the principal food of the "Sheep Eaters," a band of the Shoshone tribe who lived in Yellowstone until 1880. The Sheep Eaters also made their bows from sheep horns. By 1900, though, bighorn numbers were reduced to a few hundred due to market hunting. In 1912, naturalist Ernest T. Seton reported bighorns in the park had increased to more than 200, and travelers could find them around Mt. Everts or Mt. Washburn.

Bighorn sheep inhabit high, rocky country. The bottoms of their feet are concave, enabling them to walk and run over rocks very easily. Their tan-colored fur camouflages them against cliff rocks.

As bighorns feed, one acts as a sentinel. At any hint of danger, all take off after the leader, generally a female, and do not stop until they have climbed as high as they can or passed to the other side of the mountain.

Both males and females have horns. For the first two years of its life, the horns of a male are similar to the small, slightly curved horns of a female. By the time a male is six or seven years old, the horns form the better part of a circle. The bone interior of the horn does not extend out very far; the outer parts of the horns are hollow and may be damaged during the rut (mating season). Broken or splintered tips are never replaced, and the horn continues to grow from the base throughout the animal's life.

The rut begins in November. Males challenge one another in dramatic battles, snorting and grunting and rising onto their hind legs, then racing toward each other and crashing their heads and horns together. Their extra thick skull protects their brain during these jarring encounters. At the end of the two-month rut, males are often battered and bruised.

Although they are sure-footed in a steep and rocky environment, bighorns do have accidents. They fall off cliffs, slip on ice, and can become caught in avalanches. In Yellowstone, they also have been struck by lightning and hit by automobiles.

Population and Management

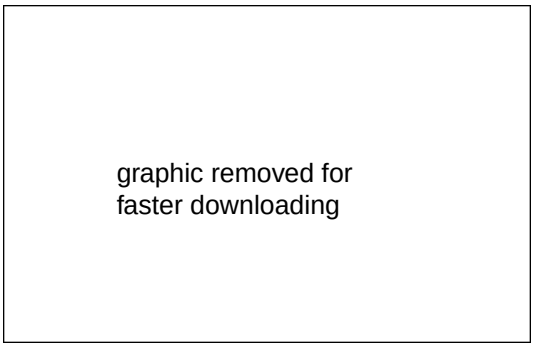
After a chlamydia (pinkeye) epidemic in 1982, the population of bighorns on the Northern Range has not recovered to previous levels. Since no sign of the disease is present, other factors are believed to be limiting the population, such as overhunting outside the park, introduction of other domestic livestock diseases, and difficulty in re-colonizing previous habitats.

Researchers are also studying bighorn sheep habitat use and the effect of human activity along the Gardiner–Mammoth road. About 65 percent of all sheep observations occur atop McMinn Bench of Mt. Everts, which has been proposed as an alternate route for the road. Moving the road to this location would affect at least 2 ewe groups and 2–3 ram groups. Studies and evaluations of data are continuing. This area is currently closed to human use to protect the sheep.

Resources for more information are listed at the end of Chapter 3, pages 82–84.

3:2

Bison



As of March 2001 . . .

Number
3,000 estimated

Where to see
- Year-round: Hayden and Lamar valleys year-round
- Summer: grasslands of the park
- Winter: thermal areas

Behavior & Size
- male (bull) weighs up to 2,000 pounds, female (cow) weighs up to 1,000 pounds
- three fairly distinct herds: Northern (Lamar Valley) herd, Mary Mountain (Hayden-Firehole valleys) herd, Pelican Valley herd
- feed primarily on grasses and sedges
- mate in late July through August; give birth to one calf in late April or early May
- can be aggressive, are very agile, and can run up to 30 miles per hour

History
- Yellowstone is the only place in the lower 48 states to have a continuously free-ranging bison population since prehistoric times
- In the 1800s, market hunting, sport hunting, and a U.S. Army campaign nearly resulted in the extinction of the American bison
- By 1902, poachers reduced Yellowstone's small herd to about two dozen animals.
- The U.S. Army, who administered Yellowstone at that time, protected these bison from further poaching
- Bison from private herds augmented the native herd
- For decades, bison were intensively managed due to belief that they, along with elk and pronghorn, were overgrazing the park
- By 1968, intensive manipulative management (including herd reductions) of bison ceased and natural ecological processes began
- In 1994, the population reached its peak at 4,200 animals

Current Issues
- See Chapter 6 for articles on management & brucellosis

For many years scientists considered Yellowstone's bison to be a subspecies known as the mountain bison. Most scientists no longer make this distinction, and consider bison to be one species, *Bison bison.*

The bison is the largest land mammal in North America. Bulls are more massive in appearance than cows, and more bearded. For their size, bison are agile and quick, capable of speeds in excess of 30 mph. Each summer, bison gore park visitors who approach too closely.

Bison are sexually mature at age 3. Although female bison may breed at younger ages, older males (>7 years) participate in most of the breeding. Life span averages 12–15 years, few individuals live as long as 20 years in the wild. Both sexes have horns, those of the cow being slightly more curved and slender than the bull's.

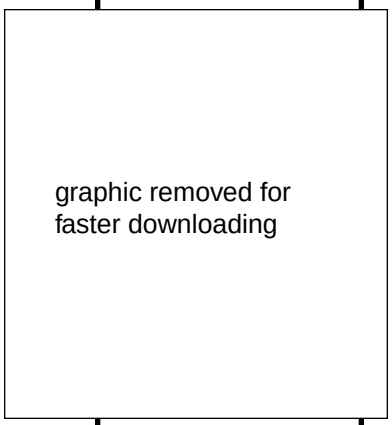
Bison are animals of the grasslands; they eat primarily grasses and sedges. Their massive hump supports strong muscles that allow the bison to use its head as a snowplow in winter, swinging side to side to sweep aside the snow.

Cows, calves, and some younger bulls comprise a herd. Mature bulls, however, spend most of the year alone or with other bulls. The exception is during the rut, or mating season. At this time, in late July and August, bulls seek out females. They display their dominance by bellowing, wallowing, and engaging in fights with other bulls. Once a bull has found a female who is close to estrus, he will stay by her side until she is ready to mate. Then he moves on to another female, and the cow may accept other bulls.

After a gestation period of 9 to 9-1/2 months, single reddish-brown calves are born in late April and May. Calves can keep up with the herds about 2–3 hours after birth and they are well protected by their mothers and other members of the herd.

However, some wolves have succeeded in killing bison calves.

Adult bison have had no large predators for many decades, although the restoration of wolves in Yellowstone is changing that—wolves in the Pelican Valley successfully kill a few adult bison each winter. Many insects prey upon the bison, and bison will rub against trees, rocks, or in dirt wallows in an attempt to rid themselves of insect pests. Birds such as the magpie "ride" a bison in order to feed on insects in its coat. The cowbird will also follow close behind a bison, feeding on insects disturbed by its steps. Dead bison provide an important source of food for scavenger species and bears just out of their dens in spring.



3:2

History

From 30 to 60 million bison may have roamed North America in the 1800s. Their historic range spread from the Pacific to the Appalachians. As a result of over-hunting, they disappeared east of the Mississippi by 1832.

While bison were found throughout the country, their main habitat was the Great Plains. For millennia bison had roamed there in herds that often numbered three to five million animals. Plains tribes developed a culture that depended on bison. Almost all parts of the bison provided something for the Native American's way of life—food, tools, shelter, or clothing. No part of the animal was wasted; even the dung was burned for fuel. Hunting bison required skill and cooperation to herd and capture the animals. Tribes' way of life fundamentally changed when they acquired horses from the Spanish in the 1600s. Now they could travel to the bison and hunt the animals more easily.

But European American settlers moving west during the 1800s changed the balance. Market hunting, sport hunting, and a U.S. Army campaign in the late 1800s nearly caused the extinction of the bison.

Yellowstone was the only place in the lower 48 states where a population of wild, free-ranging bison persisted. The U.S. Army, which administered Yellowstone at that time, protected these few dozen bison from further poaching. The protection of bison in Yellowstone and their subsequent recovery is one of the great triumphs of the American conservation movement.

Management History

Despite protection, Yellowstone's bison were reduced to less than two dozen animals in 1902. Fearing the demise of the wild herd, the U.S. Army brought 21 bison from ranches to Yellowstone. In 1906–07, the Buffalo Ranch in Lamar Valley was constructed and operated as a bison ranch. Various management techniques were used in the park until the mid 1930s in order to increase the herd size, and they were successful: The herd grew to more than 1,000 animals. During that period, very little attention was given to the park's surviving native bison herd in Pelican Valley.

Policy began to shift in the 1930s to the preservation of bison in a more natural state with less artificial manipulation. The introduced bison were released and allowed to move freely throughout the park and intermingle with the native bison. However, bison were still managed, albeit sporadically, through culling.

In January 1954, an aerial survey of the entire park placed the number of bison at 1,477. Subsequent management reductions were carried out, and an aerial count in March 1967 indicated there were 397 bison in the entire park.

In 1968, manipulative management of bison ceased, allowing intensive research on natural ecological processes to begin. Their population subsequently grew and bison began to seek new ranges inside and outside the park. Because humans now occupy much of what used to be bison habitat, conflicts inevitably occur. Bison can be a threat to human safety and can cause considerable damage to fences, crops, landscaping, and other private property. And, of significant concern to livestock producers, bison can be infected with the disease brucellosis.

Because of brucellosis, the bison are not welcome outside the park as are all other ungulates. Through the 1980s and 1990s, this issue has grown steadily into one of the most heated and complex of Yellowstone's resource controversies. For more information about brucellosis and the bison management plan, see Chapter 6.

Resources for more information are listed at the end of Chapter 3, pages 82–84.

3:2

Cats: Bobcat & Lynx

The cats of Yellowstone are seldom seen and little known. Of the three living in the park, cougars are better studied and are discussed in their own section. The little information available on bobcats and lynx is summarized below.

Lynx *(Lynx canadensis)*

Number in Yellowstone

Unknown; less than 60 observations in entire park history

Where to see

- Rarely seen; most reports from southern half of the park
- typical habitat is dense conifer forests

Behavior and Size

- Adult: 15–30 pounds, 26–38 inches long
- Gray brown fur with white, buff, brown on throat and ruff; tufted ears; short tail; hind legs longer than front
- Distinguish from bobcat: tail tip solid black; longer ear tufts; larger track
- Wide paws with fur in and around pads; allows it to run across snow and approach silently
- Solitary, nocturnal; usually beds during the day
- Eats primarily snowshoe hares, especially in winter; also rodents, rabbits, birds, and other small mammals

Research

In January 2001 research began attempting to document the number and distribution of lynx in the park.

Bobcat *(Lynx rufus)*

Number in Yellowstone

Unknown, but probably widespread

Where to see

- Rarely seen; most reports from northern half of the park
- typical habitat is rocky, open areas

Behavior and Size

- Adult: 12–35 pounds; 21–46 inches long
- Color ranges from red-brown fur with indistinct markings to light buff with dark spotting; short tail; ear tufts
- Distinguish from lynx: black rings discontinuous around tail, shorter ear tufts, smaller track
- Solitary, nocturnal
- Eats rabbits, hares, voles, mice, red squirrels, birds such as wrens, sparrows, grouse; may take young deer and adult pronghorn

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Only two photos of bobcats, from the same sighting, exist in the park's photo collection. You can see its ear tufts above and long legs below.

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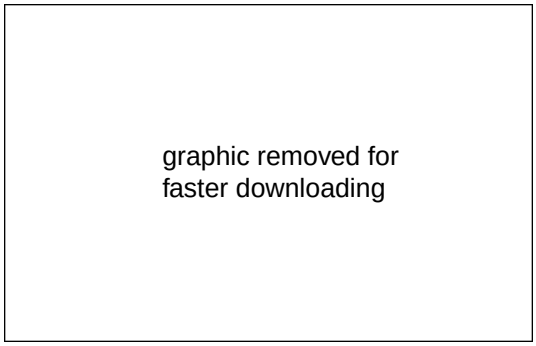
Resources for more information are listed at the end of Chapter 3, pages 82–84.

3:2

Cougar



As of March 2001 . . .

Number in Yellowstone
20–35 on the Northern Range; others in park seasonally

Where to see
Seldom seen

Behavior and size
- adult males weigh 140–165 pounds; females weigh about 100 pounds; length,including tail, 6.5–7.5 feet
- preferred terrain: rocky breaks near prey.
- prey primarily on elk and mule deer, plus porcupines and other small mammals
- bears frequently displace cougars from their kills.
- in the winter of 1999–2000, wolves apparently killed or caused the abandonment of 4 kittens in one litter
- male cougars will kill other male cougars within their territory
- litters range from 2–3 kittens; 50% survive first year

Research
Research is underway to assess effects of wolf restoration on cougars

Interaction with humans
- Few documented lion–human confrontations have occurred in Yellowstone
- Preventive/defensive measures: grouping together or carrying small children; making noise, waving arms, throwing rocks or sticks if necessary to scare off a big cat if close or stalking humans

The cougar *(Felis concolor)*, also called the mountain lion, is the largest member of the cat family in North America. Cougars live throughout the park in summer, but their secretive nature results in few sightings. In winter, most cougars move to lower elevations where they can move more easily and find more prey. The Northern Range of Yellowstone is prime habitat for cougars—snowfall is light and prey always available. Cougars probably live at higher elevations in summer and move to lower elevations in the winter.

Cougars are territorial, but male territories may overlap with several females. However, males won't tolerate other adult males in their home range and may kill them.

A cougar preys chiefly upon elk (mostly calves) and deer. It stalks the animal then attacks, aiming for the animal's back and killing it with a bite to the base of the skull or the throat area. It then eats until full, and will cache the carcass for later use. Cougars catch other animals—from red squirrels to moose—if the opportunity arises. Porcupines supplement their winter diet.

Cougars are solitary hunters who face competition for their kills from other large mammals. In Yellowstone, black and grizzly bears will take over a cougar's kill. Coyotes will try, but can be killed by the cougar instead. Wolves displace cougars from their kills less than 5 percent of the time according to recent observations.

Management History

In the early 1900s, cougars were killed as part of predator control in the park. By 1925, the remaining population was estimated to be 12 individuals. Reports of cougars in Yellowstone have increased steadily from 1 each year between 1930 and 1939 to about 16 each year between 1980 and 1988. However, increases in visitor travel in Yellowstone and improvements in record keeping during this period probably contributed to this trend.

In 1987, the first study of cougar ecology began in Yellowstone National Park. The research documented population dynamics of cougars in the northern Yellowstone ecosystem inside and outside the park boundary, determined home ranges and habitat requirements, and assessed the role of cougars as a predator in the ecosystem.

In 1998, the second phase of cougar research began. Researchers collared 21 cougars in areas used by three wolf packs in northern Yellowstone. Between 1998 and 2000, researchers documented 96 known or probable cougar kills. Their prey included 66 elk, 17 mule deer, 1 bighorn, 4 coyotes, 4 porcupines, 3 marmots, and 1 red squirrel. One cougar was responsible for killing and eating 4 coyotes. Most of the elk killed were calves; 23 percent were cows, 12 percent were bulls. They averaged one elk or deer every 7.4 days and spent almost 4 days at each kill.

Very few cougar/human confrontations have occurred in Yellowstone. However, observations of cougars, particularly those close to areas of human use or residence, should be reported.

Resources for more information are listed at the end of Chapter 3, pages 82–84.

3:2

Coyote

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coyote *wolf*

As of March 2001 . . .

Number in Yellowstone
Total unknown, but numerous. In the Northern Range, scientists know the coyote population has decreased 30–50% since wolves were reintroduced to Yellowstone due to direct mortality and changes in coyote denning behaviors and success.

Where to see
Meadows, fields, other grassland areas

Behavior & Size
- weigh 25–35 pounds, 16–20 inches high at the shoulder
- average life span 6 years; up to 13 years in Yellowstone National Park
- home range varies from 6–42 square miles
- primarily eat mice, voles, ground squirrels, pocket gophers, birds,carrion, elk calves, sometimes adult elk
- 5–7 pups are born in May in dens

Management
- Like other predators, coyotes were often destroyed in the early part of the 20th century because they sometimes preyed on livestock
- Coyotes continued to thrive because their adaptability enabled them to compensate for the destruction efforts
- Elimination of wolves probably resulted in high coyote population densities; wolves' absence opened a niche that coyotes could occupy in Yellowstone
- NPS staff monitors coyotes and uses cracker-shell rounds, bear spray, or other negative stimuli to discourage coyotes that have lost their wariness of humans

Coyotes *(Canis latrans)* are intelligent and adaptable. Like wolves, coyotes have been killed because they sometimes preyed on livestock and, in the park's early days, they were perceived as threats to ungulate populations. Unlike wolves, however, coyotes were successful in resisting efforts to exterminate them. Up until the 1940s, wildlife managers in Yellowstone also considered the coyote a threat to survival of elk and other ungulates. Then research showed that the chief foods of the coyote are voles, mice, rabbits, other small animals, and carrion. Coyotes do hunt for elk calves in the spring, but only when the calves are young.

The coyote is a small, slender animal resembling a shepherd dog in general appearance. Its coat colors range from tan to buff, sometimes gray, and with some orange on its tail and ears. Males are slightly larger than females. Yellowstone's coyotes are among the largest coyotes in the United States, and visitors frequently mistake them for wolves. Coyotes, however, are much smaller with a slighter build.

Wolf extirpation in the early part of the 20th century probably resulted in high coyote population densities, and coyotes, at least partially, slid into the niche left vacant by the removal of wolves. Coyotes are more social in Yellowstone National Park than elsewhere. Most of the coyotes on the Northern Range live and hunt in packs of 6–7 animals, with an alpha male and female, and subordinate individuals (usually pups from previous litters). They defend their territories by vocalization and scent-marking with their urine and feces. They also use scent-marking to communicate with each other about their location and breeding status.

Until recently, coyotes faced few predators in Yellowstone other than cougars, who will kill coyotes feeding on cougar kills. Since wolves were restored, however, dozens of coyote pups and adults have been killed by wolves. On the Northern Range, wolves have caused a 25–50 percent reduction in the resident coyote population through direct mortality and changes in coyote denning behaviors and success.

Coyotes also face threats from humans. They quickly learn habits like roadside feeding. This may lead to aggressive behavior toward humans and can increase the risk of the coyote being poached or hit by a vehicle. Several instances of coyote aggression toward humans have occurred here, including one that involved an actual attack.

Beginning in 1988, park staff increased monitoring of coyotes along park roadsides and began to experiment with scaring unwary coyotes from visitor-use areas with cracker-shell rounds, bear repellent spray, or other negative stimuli. Those animals that continue to pose a threat to themselves or to humans are moved to other areas of the park or killed. Signs, interpretive brochures, and park staff continue to remind visitors that coyotes and other park wildlife are wild and potentially dangerous and should never be fed or approached.

Resources for more information are listed at the end of Chapter 3, pages 82–84.

3:2

Deer, Mule & White-tailed

Mule deer are far more common in Yellowstone, living throughout the park in almost all habitats; white-tailed deer are uncommon, restricted to streamside areas of the Northern Range.

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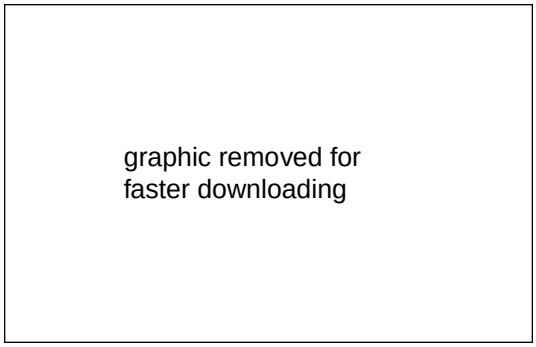

Mule deer and white-tailed deer can be told apart by their size, coloration, antler shape, tail, behavior, and where they live.

All species of deer use their hearing, smell, sight to detect predators such as coyotes or cougars. They probably smell or hear the approaching predator first; then may raise their heads high and stare hard, rotating ears forward to hear better. If a deer hears or sees movement, it flees.

Mule deer *(Odocoileus hemionus)*

Number in Yellowstone

Varies with the season: in winter, may be less than 100; in spring and summer, as many as 2,500

Where to see

- Summer: throughout the park
- Winter: Northern Range and sometimes in the Upper Geyser Basin

Behavior and Size

- male (buck): 150–250 pounds; female (doe): 100–175 pounds; 3-1/2 feet at the shoulder
- summer coat: reddish; winter coat: gray-brown; white rump patch with black-tipped tail; brown patch on forehead; large ears
- males grow antlers from April or May until August or September; shed them in late winter and spring
- mating season (rut) is in November and December; fawns born in late June to early August
- lives in brushy areas, coniferous forests, grasslands
- bounding gait, when four feet leave the ground, enables it to move more quickly through shrubs and rock fields
- eats shrubs, forbs, grasses; conifers in spring
- predators include wolf, coyote, cougar, bear

White-tailed Deer *(O. virginianus)*

Number in Yellowstone

Scarce

Where to see

Along streams and rivers in northern part of the park

Behavior and Size

- adults up to 300 pounds; 3-1/2 feet at the shoulder
- summer coat: red-brown; winter coat: gray-brown; throat and inside ears with whitish patches; belly, inner thighs, and underside of tail white
- waves tail like a white flag when fleeing
- males grow antlers from May until August; shed them in early to late spring
- mating season (rut) peaks in November; fawns born usually in late May or June
- eats shrubs, forbs, grasses; conifers in spring
- predators include wolf, coyote, cougar, bear

Resources for more information are listed at the end of Chapter 3, pages 82–84.

3:2

Elk

As of March 2001 . . .

Number in Yellowstone

- Summer: Approximately 30,000 elk in seven different herds
- Winter: Approximately 12,000–20,000 winter here
- Two major herds: Northern Range: 11,000–14,000 animals in winter; Firehole–Madison: 650–850 animals, year-round

Where to see

Summer: Gibbon Meadows, Elk Park,and Lamar Valley

Autumn, during "rut" or mating season: Mammoth Hot Springs

Winter: migrate south to the Jackson Hole Elk Refuge in Jackson, Wyoming,or north to the Northern Range and around Gardiner, Montana; a few winter in thermal areas

Behavior and Size

- male (bull) weighs about 700 pounds and is about 5 feet high at the shoulder; female (cow) weighs about 500 pounds and is slightly shorter; calf is about 30 pounds at birth
- only bulls have antlers, which they begin growing in the spring and drop in March or April
- feed on grasses, sedges, other herbs and shrubs, bark of aspen trees, conifer needles, burned bark, aquatic plants
- mating season (rut) in September and October; calves born in May to late June
- see article on the Northern Range in Chapter 6

Elk *(Cervus elaphus)* are the most abundant large mammal found in Yellowstone. European American settlers used the word "elk" to describe the animal, which is the word used in Europe for moose (causing great confusion for European visitors). The Shawnee word "wapiti," which means "white deer" or "white-rumped deer," is another name for elk. The North American elk is considered the same species as the red deer of Europe.

The bull elk is probably the most photographed animal in Yellowstone, due to its huge antlers. Bull elk begin growing their first set of antlers when they are about one year old. Antler growth is triggered in spring by a combination of two factors: a depression of testosterone levels and lengthening daylight. The first result of this change is the casting or shedding of the previous year's "rack." Most bulls drop their antlers from late March to early April. New growth begins by mid to late May.

Growing antlers are covered with a thick, fuzzy coating of skin (the blood vessels of which are depositing the bone that makes up the antler) commonly referred to as "velvet." Usually around early August, further hormonal changes signal the end of antler growth, and the animal begins scraping the velvet off, polishing and sharpening the antlers in the process.

The antler growing period is shortest for yearlings (about 90 days) and longest for healthy, mature individuals (about 140 days). Roughly 70 percent of the antler growth takes place in the last half of the period, when the antlers of a mature elk will grow 2/3 of an inch each day. The antlers of a typical healthy bull are 55–60 inches long, just under six feet wide, and weigh about 30 pounds per pair.

Bulls retain their antlers through the winter. When antlered, bulls usually settle disputes by wrestling with their antlers. When antlerless, they use their front hooves (as cows do), which is more likely to result in injury to one of the combatants. Because elk spend the winter in herds with other bulls or with gender-mixed herds, retention of antlers means fewer injuries sustained overall. Also, bulls with large antlers that are retained longer are at the top of elk social structure, allowing them preferential access to feeding sites.

Mating Season

The mating season (rut) generally occurs from early September to mid October. At this time, elk gather in mixed herds—lots of females and calves, with a few bulls nearby. The bulls bugle to announce their fitness and availability to females and to warn and challenge other bulls. When answered, bulls move toward one another and sometimes engage in battle for access to the cows. The battle involves a crashing together of antlers accompanied by intense pushing and wrestling for dominance. While loud and extremely strenuous, fights rarely cause serious injury. The weaker bull ultimately gives up and wanders off.

Calves are born in May and June. They are light brown with white spots and have little

3:2

Elk Antler Details
- usually symmetrical, but asymmetry and malformations occur
- the average, healthy, mature bull has six tines on each antler, and is known as a "six point" or "six by six"
- can occur on female elk
- one-year-old bulls grow simple spikes 10–20 inches, sometimes forked
- two-year-old bulls usually have four to five points on slender antlers
- three-year-old bulls have the same number of points, but thicker antlers
- four-year-old and older bulls typically have six points; antlers are thicker and longer each year
- eleven- or twelve-year old bulls often grow the heaviest antlers; after that age, the size of antlers generally diminishes

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scent, providing them with good camouflage from predators. While they can walk within an hour of birth, they spend much of their first week to ten days bedded down between nursings. Soon thereafter they begin grazing with their mothers, and join a herd of other cows and calves. Up to one half of each year's calves may be killed by predators during the summer. Elk calves are food for black and grizzly bears, wolves, coyotes, cougars, and golden eagles. Elk that reach maturity can live 12 to 15 years; rare individuals may live to 25 years.

Habitat

Climate is the most important factor affecting the size and distribution of elk herds here. While nearly the entire park provides summer habitat for approximately 30,000 elk, winter snowfalls force elk and other ungulates to leave most of the high elevation grasslands of the park. The number of elk that winter in the park averages between 12,000 to 20,000.

The Northern Range, with more moderate temperatures and less snowfall than the park interior, can support large numbers of wintering elk. The northern Yellowstone herd is one of the two largest herds of elk in the United States. The herd winters in the area of the Lamar and Yellowstone river valleys from Soda Butte to Gardiner, Montana. It also migrates outside of the park into the Gallatin National Forest and onto private lands.

Only one herd lives both winter and summer in the interior of the park in the valleys of the Madison and Firehole rivers. The Madison–Firehole elk herd, which numbers 650–850 animals, has been the focus of a research study since November 1991. The population appears to be naturally regulated because of severe winter conditions, to a degree not found in other, human-hunted elk herds. Researchers are examining the effects of environmental variability on ungulate reproduction and survival. This herd has both high survival of animals older than calves and high reproduction rates. Information gained in this study will be useful in comparing unhunted and hunted elk populations.

Researchers have also examined elk use of areas burned in the wildfires of 1988. They found that elk ate the bark of burned trees. Fires had altered the chemical composition of lodgepole pine bark, making it more digestible and of higher protein content than live bark. While the burned bark was not the highest quality forage for elk, it is comparable to other low-quality browse species. The researchers speculate that elk selected burned bark because it was readily available above the snow cover in winter.

See also Chapter 6, Northern Range Issue.

HORNS VS. ANTLERS

Antlers, found on members of the deer family, grow as an extension of the animal's skull. They are true bone, are a single structure, and, g enerally, are found only on males. Horns, found on pronghorn, bighorn sheep, and bison, are a two-part structure. An interior portion of bone (also an extension of the skull) is covered by an exterior sheath grown by specialized hair follicles (similar to human fingernails). Antlers are shed and regrown yearly while horns are never shed and continue to grow throughout an animal's life. However, one exception is the pronghorn, which sheds and regrows its horn sheath each year.

Resources for more information are listed at the end of Chapter 3, pages 82–84.

3:2

Fox

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fox *coyote* *wolf*

Number in Yellowstone
Unknown

Where to see
- Lamar Valley, Canyon Village
- typical habitat is rocky, open areas

Behavior and Size
- adult: 15 pounds; 21–46 inches long
- several color phases; usually red fur with white-tipped tail, dark legs and tail tips; slender, long snout
- rarely howls or sings
- distinguish from coyote by size and color
- solitary or in mated pairs
- eats voles, mice,rabbits,insects, carrion; plus other small animals and some plants
- predators include coyotes

The red fox *(Vulpes vulpes)* is one of 21 fox species in the world; its North American relatives are the gray fox, Island gray fox, swift fox, and Arctic fox. A red fox will hunt small rodents such as voles. Once it has found a rodent, the fox will spring up and dive down upon the prey, and then eat it quickly before moving on to continue the hunt.

Foxes hunt alone, but may live in small groups of one male and several females and share a large territory. Like other canids, foxes mark their territory with feces and urine.

Observations of red fox and coyote interactions were made in 1996 as part of ongoing research about coyotes in Yellowstone.

Researchers found that coyotes tolerated foxes most of the time, especially if the fox was moving through. However, if a carcass was nearby, coyote tolerance varied. It might chase off the fox, especially if the coyote was still feeding. If the coyote was resting nearby, it might tolerate the fox coming in to feed.

Coyote and fox prey on many of the same species in Yellowstone. As coyote number drop due to wolf interactions (see page 51), scientists speculate that the fox population may increase.

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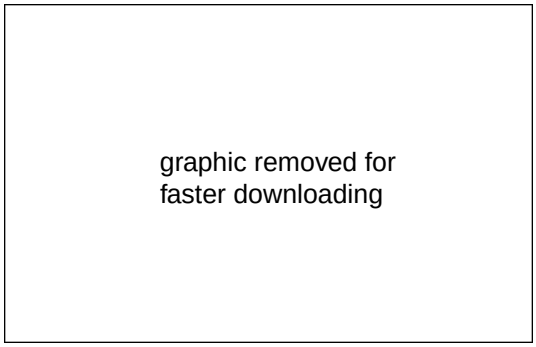
Resources for more information are listed at the end of Chapter 3, pages 82–84.

3:2

Moose



As of March 2001 . . .

Number in Yellowstone

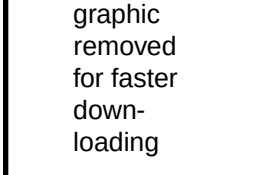
- less than 1,000
- population has declined in last 40 years perhaps due to a number of factors such as loss of old growth forests surrounding the park, hunting outside the park, burning of winter habitat (spruce-fir forests) in 1988

Where to see

- marshy areas of meadows, lake shores, and along rivers

Behavior & Size

- largest member of deer family
- adult male (bull) weighs close to 1,000 pounds; female (cow) weighs up to 900 pounds; 5-1/2 to 7-1/2 feet at the shoulder
- browses on willows and aquatic plants in summer; willows where available in winter or on conifers above 8,500 feet
- usually alone or in small family groups
- mating season peaks in late September and early October; one or two calves born in late May and June
- lives up to 18–20 years



Moose *(Alces alces shirasi)* are the largest members of the deer family in Yellowstone. A male (bull) moose can weigh more than 900 pounds and stand more than 7 feet at the shoulder. Both sexes have long legs that enable them to wade into rivers and through deep snow, to swim, and to run fast. Despite its size, a moose can slip through the woods without a sound. Moose, especially cows with calves, are unpredictable and have chased people in the park.

Both sexes are chocolate brown, often with tan legs and muzzle. Bulls can be distinguished from cows by their antlers. Adults of both sexes have "bells"—a pendulous dewlap of skin and hair that dangles from the throat and has no known function.

In summer, moose eat aquatic plants like water lilies, duckweed, and burweed. But the principle staples of the moose diet are the leaves and twigs of the willow, followed by other woody browse species such as gooseberry and buffaloberry. An adult moose consumes approximately 10–12 pounds of food per day in the winter and approximately 22–26 pounds of food per day in the summer.

Some moose that summer in the park migrate to lower elevations west and south of Yellowstone in winter where willow remains exposed above the snow. But many moose move to higher elevations (as high as 8,500 feet) to winter in mature stands of subalpine fir and Douglas-fir. Moose can also move easily in these thick fir stands because the branches prevent snow from accumulating on the ground.

Moose are solitary creatures for most of the year, except during the mating season or rut. During the rut, both bulls and cows are vocal: the cows may be heard grunting in search of a mate, and bulls challenge one another with low croaks before clashing with their antlers. A bull on the offensive tries to knock its opponent sideways. If such a move is successful, the challenger follows through with another thrust of its antlers. The weaker animal usually gives up before any serious damage is done; occasionally the opponent's antlers inflict a mortal wound.

Bulls usually shed their antlers in late November or December, although young bulls may retain their antlers as late as March. Shedding their heavy antlers helps them conserve energy and promote easier winter survival. In April or May, bulls begin to grow new antlers. Small bumps on each side of the forehead start to swell, then enlarge until they are knobs covered with a black fuzz (called velvet) and fed by blood which flows through a network of veins. Finally the knobs change into antlers and grow until August. The antlers are flat and palmate (shaped like a hand). Yearlings grow six to eight inch spikes; prime adult bulls usually grow the largest antlers—as wide as 5 feet from tip to tip. Then the bull rubs and polishes his antlers on small trees in preparation for the rut.

Cows are pregnant through the winter; gestation is approximately eight months. When ready to give birth, the cow will drive off any previous year's offspring that may have wintered with her and seek out a thicket. She gives birth to one or more calves, each weighing 25–35 pounds.

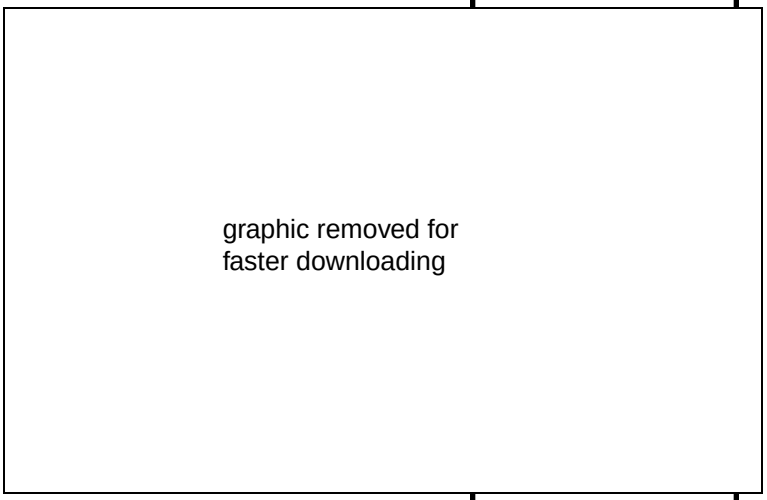
A calf walks a few hours after birth and stays close to its mother. Even so, a moose calf often becomes prey for bears or wolves and less frequently of cougars, or coyotes. An adult moose can usually outrun these predators or trample them to death.

History

Moose were reportedly very rare in northwest Wyoming when the park was established in 1872. Subsequent protection from hunting and wolf control programs may have contributed to increased numbers, but suppression of forest fires probably was the most important factor in their population increase. Moose depend on mature fir forests for winter survival. By the 1970s, an estimated 1,000 moose inhabited the park.

The moose population declined following the fires of 1988. Many old moose died during the winter of 1988–89, probably as a combined result of the loss of good moose forage and a harsh winter. Unlike moose habitat elsewhere, northern Yellowstone does not have woody browse species that will come in quickly after a fire and extend above the snowpack to provide winter food. Therefore, the overall short-term effect of the fires was probably detrimental to moose populations. Their current population and distribution are unknown.

Today, moose are most likely seen in the park's southwestern corner and in the Soda Butte Creek, Pelican Creek, Lewis River, and Gallatin River drainages.



Resources for more information are listed at the end of Chapter 3, pages 82–84.

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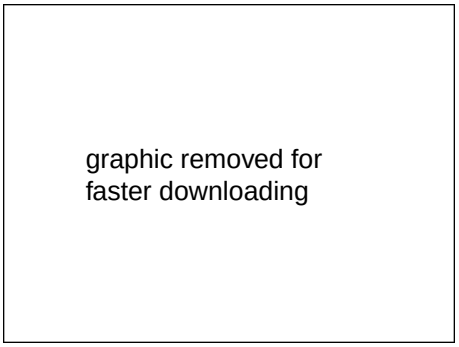
Pronghorn



As of March 2001 . . .

Number in Yellowstone
200–250

Where to see
- Summer: Lamar Valley; some may be near the North Entrance near Gardiner, Montana
- Spring, Fall,Winter: between the North Entrance and Reese Creek

Behavior and Size
- male (buck) weighs 100–125 pounds; female (doe) weighs 90–110 pounds; adult length is 45–55 inches and height is 35–40 inches at shoulder
- young (fawns) born in late May–June
- live in grasslands
- eat sagebrush and other shrubs, forbs, some grasses
- both sexes have horns; males are pronged

History
- Prior to European American settlement of the West, pronghorn population estimated to be 35 million
- Early in the 19th century, pronghorn abundant in river valleys radiating from Yellowstone; settlement and hunting reduced their range and numbers
- Park management also culled pronghorn during the first half of the 20th century due to overgrazing concerns

Research Concerns
- Since 1991, the population has dropped approximately 50%; research is underway to determine why; possible causes include predation, in-breeding depression, and loss of winter range
- This small population, which contains more genetic diversity than any other North American herd studied, could face extinction if the herd drops below 200

The North American pronghorn *(Antilocapra americana)* is not a true antelope (like gazelles), which are found in Africa and southeast Asia. The pronghorn is the only surviving member of a group of animals that evolved in North America during the past 20 million years. Use of the term "antelope" seems to have originated when the first written description of the animal was made during the 1803–1805 Lewis and Clark Expedition. Clark wrote, "He is more like the Antilope or Gazella of Africa than any other species of Goat [sic]."

The pronghorn has true horns, similar to those of bison and bighorn sheep. The horns are made of modified, fused hair that grows over permanent bony cores, but they differ from those of other horned animals in two major ways: the sheaths are shed and grown every year; they are pronged. (A number of other horned mammals occasionally shed their horns, but not annually.) Adult males (bucks) typically have 10–16 inch horns that are curved at the tips. About 70 percent of the females (does) also have horns, but they are considerably smaller than those of males, averaging 1–2 inches long, and are not pronged. The males usually shed the horny sheaths in November or December and begin growing the next year's set in February or March; they reach maximum development in August or September. Females shed and regrow their horns at various times.

Even without their unusual horns, pronghorns are easy to distinguish from the park's other ungulates. Their deer-like bodies are reddish-tan on the back and white underneath, and they have a large white rump patch. Their very large and protruding eyes provide pronghorn with an extraordinarily large field of vision. Males have a black cheek patch.

Yearling and adult females that bred the previous fall commonly deliver a set of twins in May or June. The newborn fawns are a uniform grayish-brown and weigh 6–9 pounds. They can walk within 30 minutes of birth and are capable of outrunning a human in a couple of days. The young normally stay hidden in the vegetation while the mother grazes close by. After the fawns turn three weeks old they begin following the females during daily foraging. At this time several females and their youngsters join together in nursery herds along with yearling females.

Most likely, pronghorns form groups for increased protection against predators. Whenever one individual detects danger it flares its white rump patch, signaling the others to flee. The pronghorn is well adapted for outrunning its enemies, having an oversized windpipe and heart that allow large amounts of oxygen and blood to be carried to its unusually large lungs. Pronghorn can sustain sprints of 45–50 mph. Such speed, together with keen vision, make the adults difficult prey for any natural predator. Fawns, however, are taken fairly often by coyotes, bobcats, and

golden eagles. If adults are weakened by severe winter weather, they too will fall prey to these predators.

The pronghorn breeding season commences in mid September and extends through early October. During the rut the older males defend territories in areas having the best food supplies. They warn any intruding males with loud snorts and wheezing coughs. If this behavior does not scare off the opponent, a fight may erupt. The contenders slowly approach one another until the horns meet, which is followed by vigorous twisting and shoving. Eventually, the weaker individual will retreat. Although the fights may be bloody, fatalities are rare.

The most important foods throughout the year are various shrubs like sagebrush and rabbitbrush; pronghorn eat succulent forbs during spring and summer. They seem to relish plants like locoweed, lupine, and poisonvetch. Their very large liver (proportionately, almost twice the size of a domestic sheep's liver) may be able to remove plant toxins, including selenium and various alkaloids, from the blood stream. Grasses appear to be the least-used food item, but may be eaten during early spring when the young and tender shoots are especially nutritious.

During winter, pronghorns form herds of both sexes and all ages. In spring, the herds split into smaller bands of females, bachelor groups of males between 1–5 years old, and solitary older males. These small nursery and bachelor herds may forage within home ranges of 1,000 to 3,000 acres while solitary males roam smaller territories (60 to 1,000 acres in size). Pronghorns, including most in Yellowstone, migrate between different winter and summer ranges to more fully utilize forage within broad geographic areas.

History

During the early part of the 19th century, pronghorns ranked second only to bison in numbers, with an estimated 35 million throughout the West. The herds were soon decimated by conversion of rangeland to cropland, professional hunters who sold the meat, and ranchers who believed that pronghorns were competing with livestock for forage. Today, due to transplant programs and careful management, pronghorns again roam the sagebrush prairies in herds totaling nearly one-half million animals.

Pronghorn in Yellowstone have not fared as well. The park's pronghorn population has been declining since the 1960s. Research in 1991 found that the average fawn life span in 1991 was about 35 days and nearly all collared pronghorn fawn were apparently killed by coyotes. This mortality rate closely followed the decline in total kid numbers measured during weekly surveys of the entire park. Pronghorn population numbers have continued to decline, and in late 1998 another cooperative study was initiated to determine fawn productivity and mortality rates.

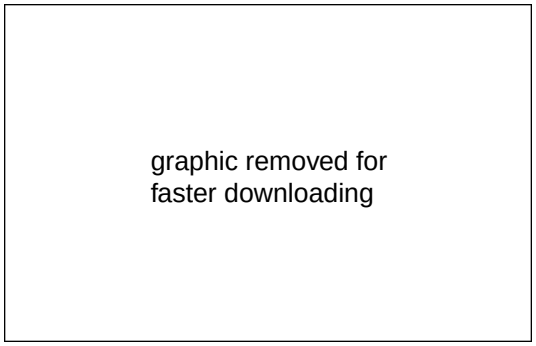
In the winter of 1995–96, the park began weekly winter surveys of pronghorn between Mammoth and Cinnabar Mountain (north of Gardiner, Montana) to help track the trend in the pronghorn herd and its relationship, if any, to the bison capture facility at Stephens Creek. During 1996–97, significant bison management operations occurred, and increased human activity and the presence of wing fences designed to channel bison may have kept pronghorn from their winter range beyond Stephens Creek. The wing fences had been designed with gaps at the bottom to allow pronghorn to pass (they often prefer to go under a fence rather than over one), plus gates were kept open to allow pronghorn to pass. However, the wing fences also seem to have made pronghorn easier prey for coyotes. The wing fences were removed in 2000.

Research continues, searching for answers to the population decline. This small, genetically unique population has a greater chance of extinction if the herd drops below 200 animals.

Resources for more information are listed at the end of Chapter 3, pages 82–84.

3:2

Wolf



As of March 2001 . . .

Number in Yellowstone area
- almost 170 wolves live in 16 packs in the greater Yellowstone area
- 8 of those packs with 126 individuals live in the park.

Where to see
They inhabit most of the park now, look at dawn and dusk

Behavior & Size
- 26–36 inches high at the shoulder, 4–6 feet long from nose to tail tip; males weigh 70–130 pounds, females weigh 80–110 pounds
- home range size varies on pack size, food, season; 18–540 square miles
- live 10–12 years in wild
- three color phases: gray, black,and white;gray is the most common; white is only in the high arctic; and black is common only in the Rockies
- prey primarily on hoofed animals: in Yellowstone, 90% of their diet is elk; also eat a variety of smaller mammals like beavers and hares
- mate in February; give birth to average of five pups in April after a gestation period of 63 days.; young emerge at 10–14 days; pack remains at the den for 3–10 weeks unless disturbed
- human-caused death is the highest mortality factor for wolves; the leading natural cause is wolves killing other wolves

Current Management
See "Wolf Restoration" in Chapter 6.

Wolves ranged widely throughout North America in pre-Columbian times. Worldwide, all wolves, except the red wolf *(Canis rufus)* of the southeastern United States, are the same species *(Canis lupus)*. Formerly, scientists recognized as many as 24 subspecies of wolves as native to the continent; current thought suggests that 5 is probably a more correct number.

Wolves are highly social animals and live in packs. In Yellowstone, the average pack numbers ten animals; some are more than twice that size. (In areas of abundant wolves, about 25 percent of the packs will have more than 8 members.) The pack is a highly evolved and complex social family, with leaders (the alpha male and alpha female) and subordinates, each having individual personality traits. Packs generally command territory that is marked by urine scenting and defended against intrusion by other wolves (individuals or packs).

Wolves consume a wide variety of prey, large and small. However, the evolution of packs and their structure allows efficient hunting of large prey while still competing with coyotes (and, to a lesser extent, foxes) for smaller meals. In Yellowstone, 90 percent of their prey is elk: 40% calves, 30–35% cows, 10–22% bulls. (Wolves kill older cows; the average age is 14. Hunters kill cows that average six years of age.) In winter, a wolf pack will kill an average of 9–14 elk per month. Wolves in the Pelican Valley also occasionally kill adult bison.

On the other hand, wolves have provided a bounty of food for a variety of animals in Yellowstone. When wolves kill an elk, ravens arrive almost immediately. Coyotes arrive soon after, waiting nearby until the wolves are sated. Bears are not so patient and will attempt to chase the wolves away, and are usually successful. Many other animals—from magpies to foxes— dine on the remains.

From their confined beginnings in a few pens, the wolves have expanded their population and range, and now are found throughout the Greater Yellowstone Ecosystem.

History

In the 1800s, westward expansion brought settlers and their livestock into direct contact with native predator and prey species. Much of the wolves'prey base was destroyed as agriculture flourished. With the prey base removed, wolves began to prey on domestic stock, which resulted in humans removing wolves from most of their historic range. (Other predators such as bears, cougars, and coyotes were also killed to protect livestock and "more desirable" wildlife species, such as deer and elk.) By the early 1900s, wolves had been almost entirely eliminated from the 48 states.

Today, it is difficult for many to understand why early park managers would have participated in the extermination of wolves. After all, the Yellowstone National Park Act of 1872 stated that the Secretary of the Interior "shall provide against the wanton

Wolves will kill each other and other carnivores, such as coyotes and cougars, usually due to territory disputes or competition for carcasses. In 2000, however, the subordinate female wolves of the Druid pack exhibited behavior never seen before: they killed their pack's alpha female; they then carried her pups to a central den and raised them with their own litters.

graphic removed for faster down-loading

As wolf numbers increase, they will encounter more humans. Wolves are not normally a danger to humans, unless humans habituate them by providing them with food. Like coyotes, wolves can quickly learn to associate campgrounds, picnic areas, and roads with easy food. This may lead to aggressive behavior toward humans and can increase the risk of the wolf being poached or hit by a vehicle.

Maps of wolf pack territories can be found in the "Yellowstone Tracker" insert of the park newspaper, and on the park's web site: www.nps.gov/yell

Resources for more information are listed at the end of Chapter 3, pages 82–84.

destruction of the fish and game found within said Park." But, this was an era before people, including many biologists, understood the concepts of ecosystem and the interconnectedness of species. At the time, the wolves' habit of killing prey species was considered "wanton destruction" of the animals. People who poisoned every carcass they passed in the backcountry (loading strychnine into carcasses was the easiest way to kill wolves) did so believing they were supporting the Yellowstone National Park Act. Between 1914 and 1926, at least 136 wolves were killed in the park; by the 1940s, wolves were rarely reported.

In the 1960s, National Park Service policy regarding human management of Yellowstone's wildlife populations changed to a policy of allowing those populations to manage themselves. Many suggested at the time that for such regulation to succeed, the wolf had to be a part of the picture.

Also in the 1960s and 1970s, a national awareness of environmental issues and consequences led to the passage of many laws that were designed to correct the mistakes of the past and help prevent similar mistakes in the future. One such law was the Endangered Species Act, passed in 1973. The U.S. Fish and Wildlife Service is required by this law to restore endangered species that have been eliminated, if possible. (National Park Service policy also calls for restoration of native species where possible.)

See Chapter 6 for a detailed discussion of wolf restoration.